

# TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

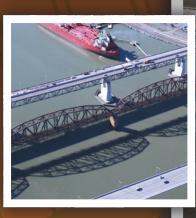
CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

# 2009 Annual Report





















# **2009 Annual Report**

Prepared by the





















### **2009 Annual Report**

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# 2008 YEAR IN REVIEW

The Self-Anchored Suspension Span's two marine foundations—T1 and E2—were completed

Skyway contract was accepted

Concrete pours for cap beam of SAS foundation W2 began



West Approach opens permanent eastbound structure opened to traffic

**Educational Outreach Subcommittee created** 



Began fabrication of double-deck steel truss for East Tie-In of Temporary Detour

> Visioning conference for Gateway Park included TBPOC and Oakland Mayor Ron Dellums







All permanent marine foundation piles for Oakland Touchdown were completed

Adobe Systems named BayBridge360 "Site of the Day"

Steel for viaduct (middle section) of Temporary Detour was erected









TOLL BRIDGE PROGRAM
OVERSIGHT COMMITTEE

### 2009 ANNUAL REPORT EXECUTIVE SUMMARY

To Members of the California Legislature:

With another busy year behind us, the Toll Bridge Program Oversight Committee (TBPOC) is pleased to present the 2009 Annual Report. This third annual update highlights the significant strides and achievements made in 2008, as well as looks at the remarkable year ahead. While the scope and scale of work in 2009 is astonishing, we will undertake these construction and engineering feats with the same dedication and focus that have guided our efforts so successfully to date.

In 2008, we focused on setting the stage for what will be our busiest year yet in 2009. That is not to say 2008 did not have its own milestones, including the opening of the West Approach's permanent eastbound roadway, completing the Skyway and the Self-Anchored Suspension Span's marine foundations, finishing all work on permanent piles in the Bay, and ongoing steel fabrication throughout the year.

# 2008 HIGHLIGHTS

### SAN FRANCISCO-OAKLAND BAY BRIDGE

#### **WEST APPROACH**

The removal and replacement of the 1-mile stretch of freeway connecting San Francisco to the San Francisco-Oakland Bay Bridge was close to completion in 2008.

- The **opening of the permanent eastbound lanes** in April represented the final major traffic shift, from a temporary structure to a permanent one. Gov. Arnold Schwarzenegger, San Francisco Mayor Gavin Newsom and Oakland Mayor Ron Dellums were among the dignitaries who praised this milestone at a community celebration.
- The West Approach received **seismic safety certification** in December, which states that the entire West Approach meets current seismic safety standards.
- Other highlights included the demolition of the temporary eastbound roadway and the opening of the Sterling Street on-ramp.



### **2008 HIGHLIGHTS** Ongoing construction of the new East Span included the following highlights: • All permanent in-water pile driving was completed in 2008. • E2 and T1—the two marine foundations for the Self-Anchored Suspension (SAS) Span—were completed in January 2008. • Fabrication of the SAS roadway deck and tower sections was fully underway last year, and the first sections are to arrive from China in 2009. • Erection began on the **temporary structures** necessary to support the SAS during construction. • Workers substantially completed three of the Yerba Buena Island (YBI) Transition Structure's 13 supports, with seven more in progress. • Crews continued building the Temporary Detour on Yerba Buena Island. Traffic will shift to the detour in 2009 so construction can continue on the YBI Transition Structure. • For the **Oakland Touchdown**, crews built the support structures for both the westbound and most of the eastbound decks. Work also began on the westbound approach. • The **Skyway** was completed in early 2008. • Contract documents for the next YBI Transition Structure project were finalized and advertised. The YBI Transition Structure will transition traffic from the parallel roadways of the new East Span to the upper and lower decks of the existing Yerba Buena Island Tunnel. BayBridge360, a new section of BayBridgeInfo.org, won industry recognition for providing viewers with dynamic visual content showcasing the seismic retrofit projects. The Educational Outreach Program began numerous efforts in 2008, including forming a dedicated outreach team representing various stakeholders, launching a pilot education program in Oakland schools, and pursuing a partnership with the Lawrence Hall of Science at the University of California at Berkeley. The Small Business Program issued its first Small Business and DVBE Utilization Report, focused on developing a curriculum for future training and education initiatives, and hosted a bidder's conference for small businesses interested in the next YBI Transition Structure project. • Visioning and planning sessions for Gateway Park involved numerous local, regional and statewide leaders, including Oakland Mayor Ron Dellums, the TBPOC and the Executive Director of the San Francisco Bay Conservation and Development Commission Will Travis.



Crews erecting one of the Yerba Buena Island Transition Structure supports



## 2008 HIGHLIGHTS

### **BENICIA-MARTINEZ BRIDGE**

Crews began reconfiguring the original 1962 bridge to carry four lanes of southbound traffic, along with a new bicycle/pedestrian path.

### **DUMBARTON & ANTIOCH BRIDGES**

An ongoing seismic study indicates an urgent need to retrofit both the Antioch and Dumbarton bridges. The combined cost of retrofitting the bridges is estimated to be \$950 million.

### **LOOKING AHEAD TO 2009**

We will celebrate numerous milestones on the Bay Bridge in 2009. Early in the year, the West Approach will be completed as the Harrison Street off-ramp reopens and the final westbound and eastbound roadway alignments open to traffic. Crews will also close the entire Bay Bridge for the first time since 2007 in order to shift traffic onto the Temporary Detour at Yerba Buena Island so construction of the Yerba Buena Island Transition Structure's mainline can begin. For the Self-Anchored Suspension Span, the first steel shipments from China for the permanent SAS will arrive, as will the crane barge that will lift the SAS steel segments into place. Construction of the Oakland Touchdown's westbound structure will finish so the SAS contractor can use the structure to access the Skyway, in order to work on the eastern end of the SAS.

Work on other bridges will continue as well. The reconfiguration of the original Benicia-Martinez Bridge to carry four lanes of southbound traffic, along with shoulders and a pedestrian/bicycle path, is expected to be completed in 2009, several months ahead of schedule.

On the Antioch and Dumbarton bridges, design and construction plans are expected to be ready in late summer.

We are looking forward to continuing our progress with all of the programs under the Toll Bridge Program in the year ahead, while we endeavor to keep you and your constituents informed of our work through many new and exciting channels.

Thank you for your continued support.

Will Kempton, Chair

Director

California Department of Transportation

Steve Heminger

Executive Director

Bay Area Toll Authority

John F. Barna, Jr.

Executive Director
California Transportation Commission



### **TOLL BRIDGE PROGRAM UPDATE**

Several events—both momentous and challenging—have brought us to this point, where we can see the silhouette of the new East Span take shape. As we have traveled to this point, we have never forgotten the lessons of Loma Prieta, or that the clock is always ticking.

This progress would not be possible without the support of the public through the passage of Regional Measure 1 (RM1), which authorized an increase in bridge tolls, or the vision of the State Legislature with Senate Bills (SB) 60 and 226 and Assembly Bill (AB) 144. Those bills established the Toll Bridge Seismic Retrofit Program in 1997 and provided funding for critical seismic retrofit work on state-owned toll bridges. AB144 created the Toll Bridge Program Oversight Committee (TBPOC) in 2005, which is composed of the director of the California Department of Transportation (Caltrans), and the Executive Directors of the Bay Area Toll Authority (BATA) and the California Transportation Commission (CTC). The legislation charged these directors with joint oversight and control of the program.

### **Program Budget and Schedule**

In addition to establishing the TBPOC, AB 144 consolidated all toll revenue collection on the seven state-owned Bay Area toll bridges, and placed financing of the Toll Bridge Program under the jurisdiction of BATA. The entire \$8.7 billion AB 144/SB 60 baseline budget for the program is being funded under a BATA-approved finance plan that is in turn funded from a combination of tolls with state and federal transportation funding. (Appendix A, Tables 1 and 2).



### STATUS OF TOLL BRIDGE PROGRAM PROJECTS

San Francisco-Oakland Bay Bridge East Span Replacement
San Francisco-Oakland Bay Bridge West Approach Replacement

San Francisco-Oakland Bay Bridge West Span Seismic Retrofi

San Francisco-Oakland Bay Bridge Yerba Buena Island Tunnel

San Mateo-Hayward Bridge Seismic Retrofit

Richmond-San Rafael Bridge Seismic Retrofit

Fastbound Carquinez Bridge Seismic Retrofit

Benicia-Martinez Bridge Seismic Retrofi

New Benicia-Martinez Bridge (Regional Measure 1)

San Diego-Coronado Bridge Seismic Retrofit

Vincent Thomas Bridge Seismic Retrofit

Under Construction
Under Construction

COMPLETED

COMPLETED

COMPLETED

COMPLETED

COMPLETE

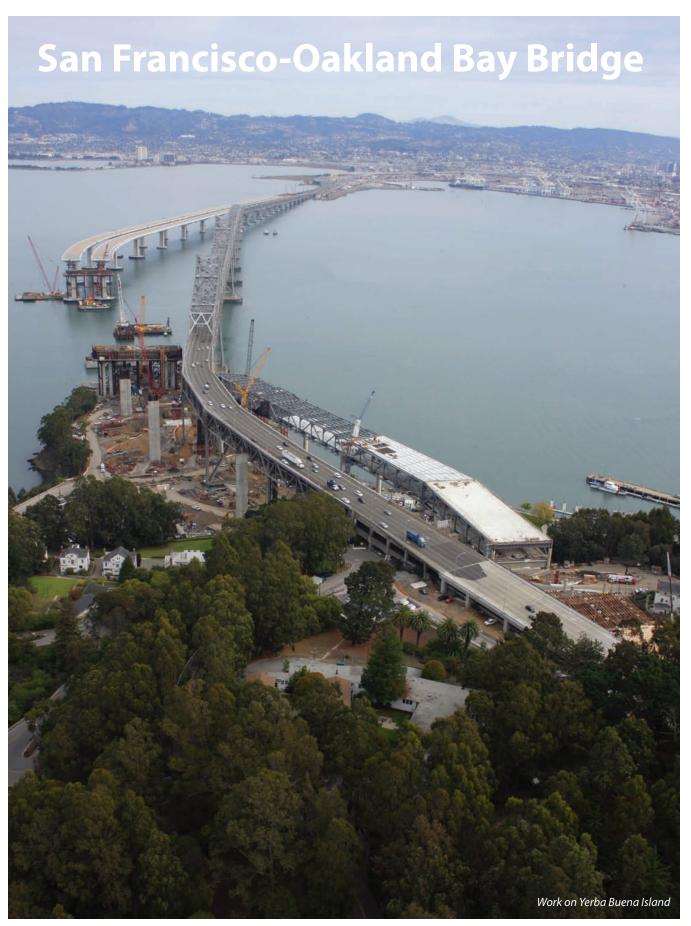
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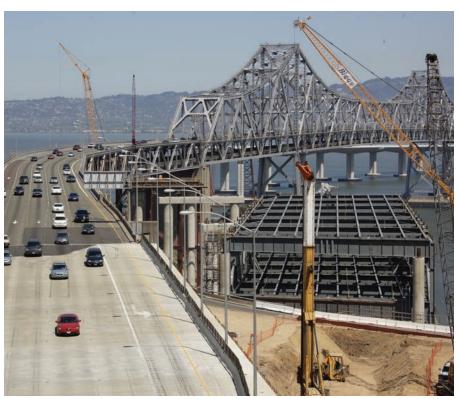
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YBI Temporary Detour under construction

### 2008: Laying the Foundation

Skyway

**COMPLETED** 

• SAS marine foundations (T1 & E2)

### **ONGOING**

- West Approach
- Temporary supports for SAS
- Yerba Buena Island Transition Structure foundations
- Yerba Buena Island Temporary Detour
- Oakland Touchdown westbound structure and roadway
- Steel fabrication

### THE SAN FRANCISCO-OAKLAND BAY BRIDGE: BUILDING A FOUNDATION FOR THE FUTURE!

The series of mind-boggling construction and engineering feats to retrofit and replace the entire 8-mile San Francisco-Oakland Bay Bridge represents the largest—and most challenging—public works effort in California history. This monumental undertaking requires a massive mobilization of resources and resolve. The determination of the vast workforce—from designers to construction crews—is unprecedented. It can be seen in every element of this endeavor, from such daunting tasks as building a nearly half-mile temporary detour on 150-foot-tall supports, to the smallest details, such as the Art Deco touches on the support columns of the West Approach.

Keeping more than 280,000 vehicles flowing smoothly amidst this construction is a constant reminder of the herculean task before us. Yet we are up to the job. While this project has already made history, we look forward to the milestones that lie ahead.

The past year presented significant challenges. To mitigate schedule issues, the program tapped the contingency fund established to respond to concerns during construction. While construction delays occurred on the SAS during fabrication, our team worked with the contractor to begin solving the problem and move production forward.

It is critical to address problems when they arise and move through them as efficiently as possible in order to stay on schedule. We are continuing to work with the contractor to regain lost time in the contractor's schedule.

In 2008, our achievements traversed the entire Bay Bridge corridor. On the West Approach, crews completed the last major traffic switch as drivers moved onto the new permanent east-bound structure, and the last retrofitted on-ramp opened at year's end.

On Yerba Buena Island (YBI), the Temporary Detour continued to take shape. So did the Self-Anchored Suspension (SAS) Span, as the temporary supports began to rise from the bay and work finished on the two marine foundations.

The Skyway is complete, awaiting its connection to the SAS at one end, while workers make progress on the Oakland Touchdown at the other end.

These achievements have paved the way for the major milestones anticipated for 2009—moving the Bay Bridge ever closer from bold vision to grand reality.



### **WEST APPROACH ATTRACTS STAR POWER**

On a picture-perfect spring day under clear and sunny skies, Gov. Arnold Schwarzenegger cut a chain strung across the West Approach to officially open the structure's new (and permanent) eastbound roadway. Joined by San Francisco Mayor Gavin Newsom and Oakland Mayor Ron Dellums, along with state transportation leaders, local dignitaries and other guests, Gov. Schwarzenegger presided over this festive community celebration in April. With the opening of the new eastbound approach to the Bay Bridge, drivers are once again enjoying those sunny skies, thanks to unobstructed views and a straight shot onto the bridge.

This was one of the final milestones of the "retrofit by replacement" of the West Approach, a 1-mile stretch of Interstate 80 connecting San Francisco to the Bay Bridge. The opening of this permanent structure carrying eastbound traffic was the final major traffic shift—from a temporary structure to a permanent one—for the West Approach. For more than a year, eastbound motorists had been diverted onto a temporary structure tucked beneath westbound traffic coming off the Bay Bridge.

Gov. Schwarzenegger characterized the Bay Bridge, and the latest milestone on the West Approach, as a powerful reminder that Californians always rise to a challenge.

Bordered by 5th Street and the Anchorage at Beale Street, the West Approach has been undergoing seismic safety retrofit work that involves completely removing and replacing this stretch of highway, as well as six on- and off-ramps, since 2003. Throughout the project, more than 280,000 vehicles a

day have flowed through this critical and essential seismic construction.

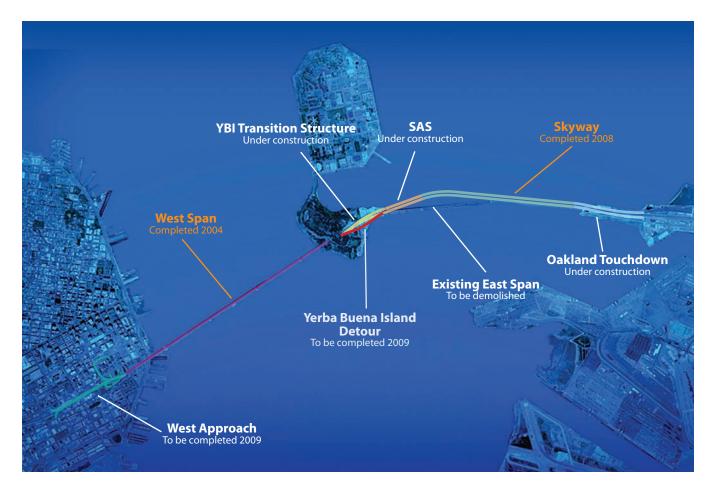
Prior to retrofitting, the West Approach had an upper and lower deck configuration from 3rd Street to the Anchorage, with one foundation system supporting both decks. Each deck now has an independent column and foundation support system, a crucial aspect of making them seismically sound. The roadways between 5th and 3rd streets, leading to the double-decks, are parallel concrete decks.

The shift to the permanent eastbound structure came almost one year after Caltrans moved traffic to the temporary eastbound structure, allowing crews to demolish the final 3,000-foot section of the original West Approach. The temporary eastbound structure ran beneath the westbound lanes, so the old eastbound lanes could be rebuilt. Crews demolished the original eastbound structure in just 17 days. At the end of 2008, the Sterling Street on-ramp reopened, and the project received seismic safety certification. In February 2009, the project will be complete as the Harrison Street off-ramp reopens and the final westbound and eastbound roadway alignments open to traffic.

Throughout the project, and continuing into 2009, public information officials have worked closely with nearby residents and businesses to keep them informed of progress and to resolve their concerns. The patience of nearby residents and businesses is greatly appreciated, and their support throughout the project has been a key factor in its success.







### EAST SPAN CONTINUES TO TAKE SHAPE

The silhouette of the new East Span continued to grow in 2008, making it easier for drivers to see how the original double-deck cantilever bridge will eventually be replaced with graceful parallel roadways that offer expansive views of the bay. With the Skyway complete, most activity on the East Span is moving west toward Yerba Buena Island.

Yerba Buena Island is a hive of activity, as construction crews work on the Temporary Detour that will shift traffic so construction can begin on the Yerba Buena Island Transition Structure (YBITS). Crews are also busy working on the Self-Anchored Suspension (SAS) Span's temporary structure that will support the SAS' roadways until the main cable can be placed.







### **SELF-ANCHORED SUSPENSION BRIDGE**

If one single element bestows the status of world-class on the new Bay Bridge, it is the Self-Anchored Suspension Span (SAS). This engineering marvel will be the world's largest SAS bridge—at 2,047 feet long—as well as the first bridge of its kind built with a single tower.

The SAS is not just another suspension bridge. Traditional main cable suspension bridges have twin cables with smaller suspender cables connected to them. These cables hold up the roadbed and are anchored to separate structures in the ground. While there will appear to be two main cables on the SAS, there will actually be only one. This single cable is anchored within the eastern end of the roadway. The cable

is carried over the tower and wraps around the two side-by-side decks at the western end, then back up and over the tower to anchor back into the eastern end of the SAS roadway.

The SAS and the rest of the new East Span is being built north of the existing bridge. By switching from the existing East Span's double-decks to side-by-side roadways, drivers will enjoy unencumbered and expansive views of the Bay Area as they pass beneath an angled canopy of suspension cables. The SAS and Skyway will feature a 15-foot-wide cantilevered bicycle and pedestrian path on the eastbound side of the bridge, so those traveling on foot or two wheels between Oakland and Yerba Buena Island (YBI) can enjoy majestic views of the bay as well.



#### MARINE SUPPORTS COMPLETED

The completion of the SAS' two marine support structures is a testament to determination and persistence. T1 and E2 will support the SAS tower and the eastern end, respectively. The contract for the two piers was accepted in January, marking the end of a challenging, yet ultimately rewarding, construction project.

T1 is the foundation for the elegant single tower, which will rise 525 feet above sea level. T1 includes a massive steel footing box (85 feet long and 73 feet wide) welded to steel shells surrounding 13 concrete piles, which reach down nearly 200 feet into the bay to anchor into bedrock. E2 consists of a similar footing box and two enormous concrete columns that reach approximately 120 feet above the water.

One of the biggest hurdles that crews deftly overcame was deep water construction. When pile driving in water as deep as the San Francisco Bay, the stability of the bedrock is not always assured. Engineers were confident that they would secure the piles into bedrock 320 feet below the water's surface—yet this had never been done before, and engineers knew that despite their diligence and confidence, success was not necessarily guaranteed.

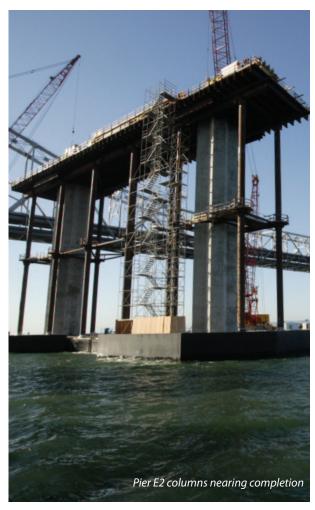
A second challenge was the tight squeeze created by the immensity of the steel plates used for the foundations, particularly T1. The massive plates made access to certain areas of T1 extremely tight, making crews' work even more physically demanding.

Despite the unknowns beyond the engineers' control—from tighter-than-expected working conditions to the stability of the bay's bedrock—the success of the foundations was critical. While other projects might get more attention, the foundations are the backbone of the project's success.

### **BUILDING A BRIDGE TO BUILD A BRIDGE**

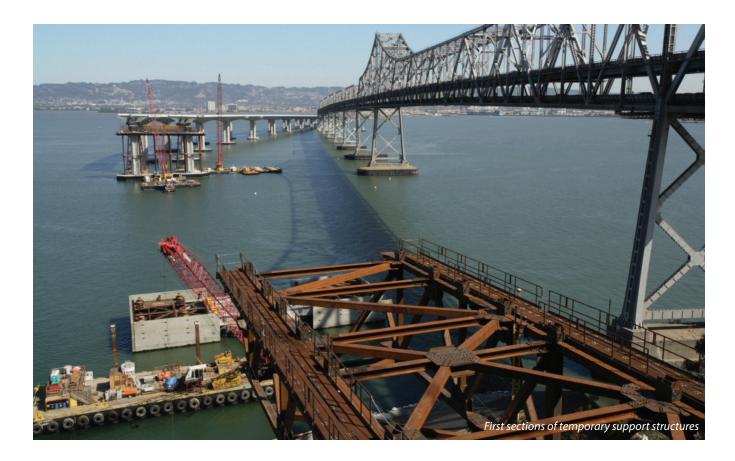
Temporary support structures have begun to rise out of the bay and on Yerba Buena Island, as construction moves forward on the Self-Anchored Suspension (SAS) Span. To build the SAS, crews must first construct a temporary bridge to support work on the permanent span. Crews are building a 20,000-ton temporary bridge to build a 50,000-ton permanent bridge.

While the SAS will only have three supports, the temporary structure will have seven. The foundations for the first four temporary supports have already been built, as have two of the seven columns. A third temporary column was under construction at the end of 2008, while the steel for three more temporary supports arrived at year's end. Steel for the temporary structure is being supplied by Shanghai Zhenhua Port Machinery Company in China and American Bridge Manufacturing in Oregon.









Other companies involved in fabrication and construction are Jesse Engineering and XKT Engineering (pile driving frames), and Twin Brothers (piling supplier), all based in the United States.

Reporters visited the work site in September to see the temporary structures firsthand, which led to a front page headline in the *San Francisco Chronicle* proclaiming "New Bay Bridge Span On Road to Being Icon."

While drivers on the existing East Span will see these temporary structures, they look nothing like the final bridge that will grace the Bay Area with an elegant and sweeping design. The temporary work includes steel trusses and multiple support structures; the SAS will be a graceful white span with only three supports.

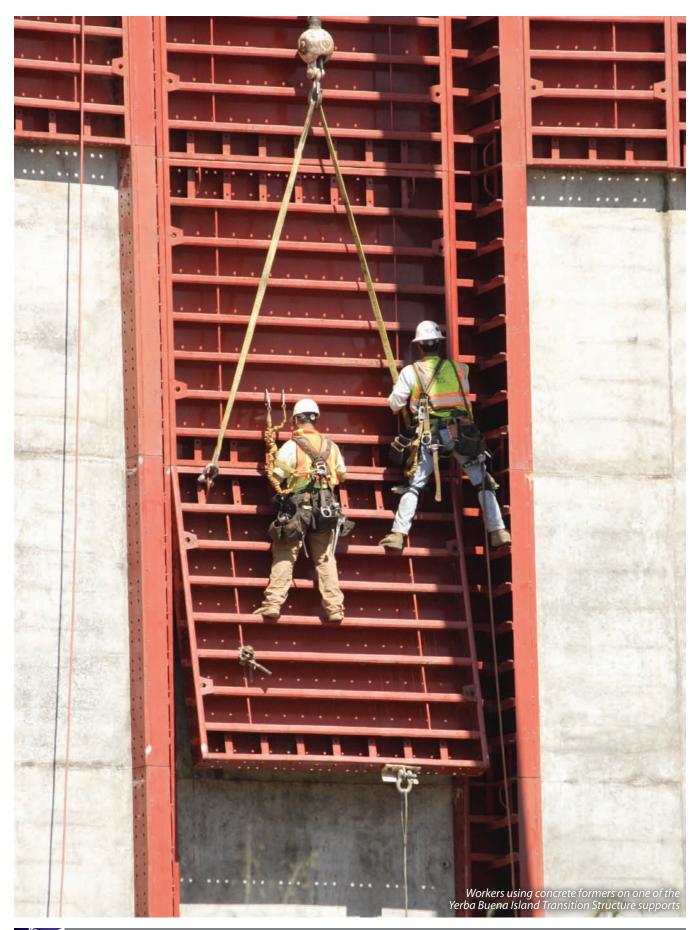
To build a different kind of suspension bridge requires a different kind of process. Traditional suspension span construction starts with the main cable and suspender cables being placed, and then the roadway being built. Traditional suspension spans also have two main cables that are anchored into the foundations. The SAS has only one cable that is anchored at the east end of the span, wraps around the west end, and then anchors back into the east end. Because of this unique design, the roadway must be built first.

As workers build the temporary supports, crews will begin erecting the permanent roadway and signature tower for the SAS. Assisting this endeavor will be a massive barge equipped with a 1,700-metric-ton shear leg crane sporting a 300-footlong boom that will be visible to drivers on the Bay Bridge. Crews will not wait until the entire temporary structure is in place to start on the permanent SAS. The temporary structures are being built west to east from YBI toward the Skyway. Crews have already built the temporary steel truss that will hold up the permanent roadway between the first two temporary supports, while the truss between the second and third supports is under construction.

In addition to the temporary support structure, crews will erect a temporary catwalk that will travel the path of the SAS cable, so ironworkers can work on the cable as it is placed.

Once the permanent SAS span is in place, the cables will be tightened and the bridge will be lifted off the temporary support structure.

While work on the temporary structures will continue throughout 2009, a major milestone will be the placement of the last two in-water foundations for the temporary SAS support structure in spring 2009. This will be the last in-water foundation work—temporary or permanent—in the San Francisco Bay for the new East Span.







#### **BRIDGE FABRICATION**

Fabrication of the SAS deck and towers sections continued throughout 2008, with the first deck sections expected in the Bay Area in mid-2009. The Shanghai Zhenhua Port Machinery Company (ZPMC) in China is a major steel fabricator for the SAS. ZPMC is already known in the Bay Area as a supplier of port cranes for the Port of Oakland.

While fabrication of the SAS road decks and tower began in late 2007, teams started preparing in late 2006, conducting training and developing the assembly line. That year-long preparation has paid off, as fabrication was fully underway and ongoing throughout 2008.

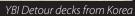
Despite some initial challenges, the fabrication process is moving forward under the close watch of the SAS project team to ensure that the SAS is completed as quickly as possible. A Caltrans oversight team is on site in China for quality assurance and to ensure timely delivery.

The first fruits of this labor—the westernmost SAS road deck segments—will arrive in the Bay Area during the first half of 2009. These shipments take approximately one month to travel by ship from China to the Bay Area. The shear leg crane barge needed to lift these massive segments into place will arrive during the first few months of 2009.

Bridge parts are being fabricated in more than 35 locations around the world, from Oslo, Norway to Seoul, South Korea. In the United States, fabrication is taking place in more than 25 cities, including 12 in California.









Cast steel saddle from Japan



SAS Tower segments from China

### A GLOBAL PERSPECTIVE:

### Where the East Span is being fabricated

Hokaido, Japan Seoul, South Korea Pusan, South Korea Shanghai, China Taiwan Tacoma, Washington

Clackamas, Oregon

Eugene, Oregon

Reedsport, Oregon

Portland, Oregon

Napa, California

San Francisco, California

Fairfield, California

Campbell, California

Antioch, California

Huntington Beach, California

Fontana, California

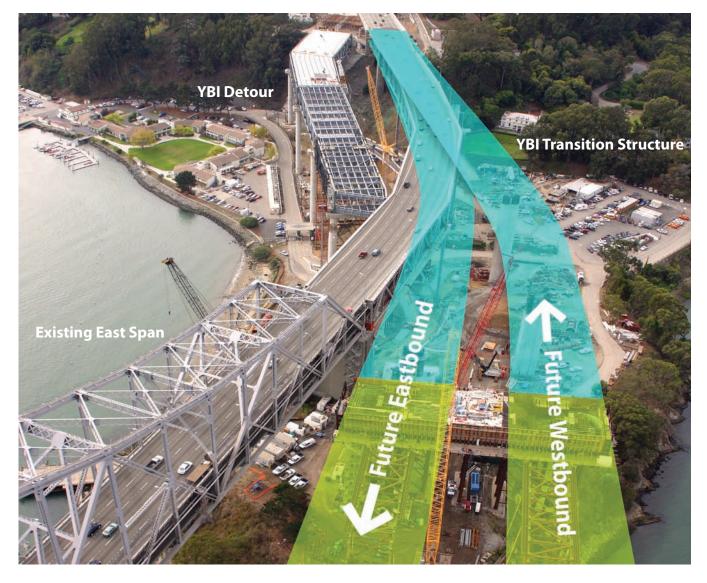
Coolidge, Arizona

PACIFIC OCEAN

YERBA BUENA
ISLAND DETOUR

SELF-ANCHORED SUSPENSION SPAN





### YERBA BUENA ISLAND TRANSITION STRUCTURE & TEMPORARY DETOUR

While the Yerba Buena Island Transition Structure (YBITS) is one of the shortest projects on the Bay Bridge, it is one of the most important and challenging, as it will transition traffic from the parallel decks of the East Span to the double-decks of the Yerba Buena Island tunnel and West Span.

Of the YBITS' 13 supports (footings and columns), three have been substantially completed, and seven are in progress. This YBITS advance work was attached to the contract to build a temporary detour south of the existing bridge. Doing the foundation work in advance reduces risk to the schedule. Foundation work is notoriously a source of delay due to unknowns encountered in the ground.

Next year, a YBITS construction contract will be awarded. The contract was advertised in August 2008 and includes opportunities for small businesses. The contract will focus on the superstructure, including the roadways.

The contract will be awarded near the time of the highly anticipated traffic switch to the YBI Temporary Detour on the south side of the existing span. Traffic is being rerouted so crews can demolish portions of the original bridge and build and connect the YBITS without reducing or impeding traffic flow. Work on the YBITS' main structure cannot begin until traffic has been safely routed to the temporary detour.

For the West Tie-In (WTI)—the section of the detour closest to the YBI tunnel—most of the substructure, including support structures, was completed in 2008. All of the piles for the supports were driven, and most of the support structure (footings and columns) were built as well. The frame and roadway for the WTI is currently in progress.

Much of the steel for the detour's viaduct (middle section) was erected in 2008. Dongkuk Steel of South Korea fabricated the



steel for this portion of the viaduct. By the end of 2008, approximately 40 percent of the deck concrete had been poured.

The East Tie-In (ETI)—the easternmost section of the detour that will connect to the existing East Span—is the most challenging component of the detour, as it is not being built in place. Instead, it is being built 150 feet in the air and adjacent to where it will finally rest. In late summer or early fall 2009, a 288-foot-long section of the existing bridge will be cut away and shifted to the north as the ETI is rolled in, connecting the detour to the bridge. The herculean endeavor will involve aerial construction taking place more than 100 feet over Yerba Buena Island. This will be one of the most significant realignments on the bridge to date, and traffic will flow on the detour until the new East Span opens.

Approximately 40 percent of the ETI's foundations were complete at the end of 2008. The first steel was erected at the end of 2008 in the first columns of the ETI supports. The steel for the supports is being produced by Thompson Metal Fabrica-

tion and Jesse Engineering in Washington state. Stinger Welding in Coolidge, Arizona is providing the steel for the ETI's trusses. The steel is approximately 75 percent fabricated.

While the traffic switch poses its own challenges, construction of the detour has not been without its hurdles. An existing Coast Guard base is adjacent to the construction, so crews have been mindful to maintain around-the-clock access to the base. Crews have also been diligent about keeping nearby Macalla Road—heavily used by construction crews—repaired so as not to inconvenience residents and visitors to Yerba Buena Island.

Ensuring safety is paramount for all workers throughout the seismic retrofit projects. Workers on Yerba Buena Island are under unique constraints to maintain safety, as work occurs in a populated yet very confined environment. Crews are involved in everything from trimming trees and brush to reduce the risk of fires to directing traffic so residents and visitors safely bypass construction activity.

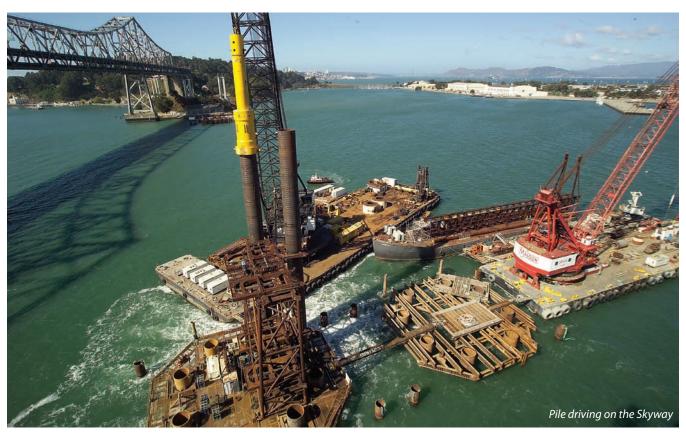




### **SKYWAY**

Another project milestone is the completion of the Skyway. As the longest section of the new East Span at 1.2 miles, the graceful parallel decks of the Skyway not only will change the appearance of the Bay Bridge, but also the way drivers experience the bridge, thanks to sweeping unencumbered views of the bay. The side-by-side east- and westbound decks will each have five lanes and 10-foot-wide shoulders to help keep traffic flowing.

The completion of the Skyway also represents a huge leap forward for bridges designed specifically to move during a major quake, as it features several state-of-the art seismic safety innovations. For additional seismic stability, the Skyway marine foundations consist of 160 rebar and concrete-filled steel pipe piles measuring 8 feet in diameter and dispersed among 14 sets of piers. The 365-ton piles were driven more than 300 feet into the deep bay mud. The new East Span piles were driven in at an angle (battered), rather than vertically, to obtain maximum strength and resistance. This was done by using one of the world's largest hydraulic hammers, which generates 1.2 million pounds of force. To lessen the impact of pile driving on fish and other marine life, dense columns of air bubbles were created around the piles underwater. The bubbles helped dissipate the shock waves produced by hammering.

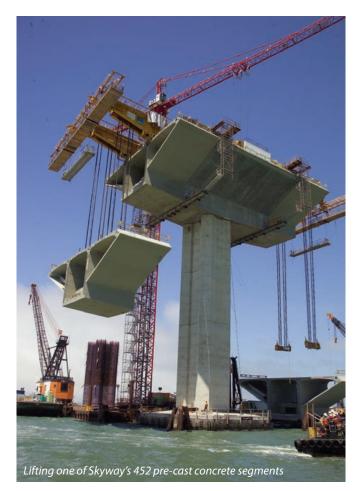




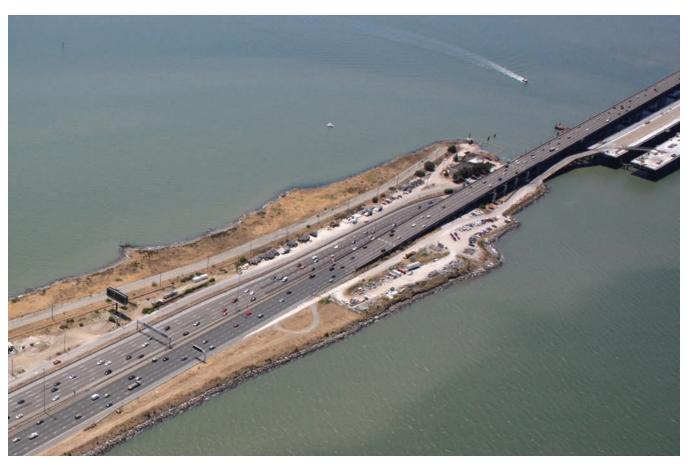
In addition, 60-foot-long hinge pipe beams connecting the Skyway to the SAS will allow deck segments on the Skyway to withstand greater motion and to absorb more earthquake energy. In the event of an earthquake, damaged fuses inside the hinge-pipe beams, which will have absorbed the brunt of the earthquake's energy, can be removed and replaced.

The Skyway's decks are composed of 452 pre-cast concrete segments (standing three stories high), and contain approximately 200 million pounds of structural steel, 120 million pounds of reinforcing steel, 200,000 linear feet of piling and about 450,000 cubic yards of concrete. These are the largest segments of their kind ever cast, and they were lifted into place by winches that were custom-made for this project.

The Skyway also features a 15.5-foot-wide bike/pedestrian path on the south side of the eastbound deck and will extend to Yerba Buena Island along the SAS. This effort moves the Bay Area closer to completing the proposed 400-mile multi-use Bay Trail, which will connect all nine Bay Area counties. The path will include seven viewing platforms that will allow pedestrians and bicyclists to enjoy sweeping vistas of the bay and hills.











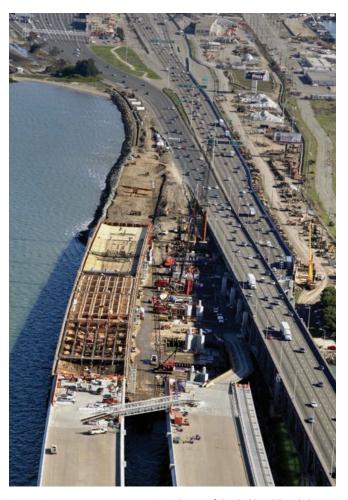
# TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

### **OAKLAND TOUCHDOWN**

The Oakland Touchdown #1 Contract was awarded to MCM Construction in August 2007, and construction was fully underway in 2008. Crews built most of the substructure (i.e., piles, footings and columns) for both the westbound approach and began working on the eastbound substructure in 2008. To erect the substructure, crews first built a temporary trestle to provide access. The trestle is an essential measure to protect the sensitive Oakland shoreline from construction impacts.

Construction also began in 2008 on the 1,000-foot-long stretch of the westbound approach, from the toll plaza in Oakland to the Skyway. Nearly 40 percent of the westbound roadway's frame was built by the end of 2008, with the entire frame expected to be completed in fall 2009. Crews also erected all temporary support structures for the westbound roadway, and began constructing the westbound deck in late 2008, including the first superstructure concrete pour. Construction also began on 500 feet of the eastbound approach, with initial work in 2008 on the eastbound frame.

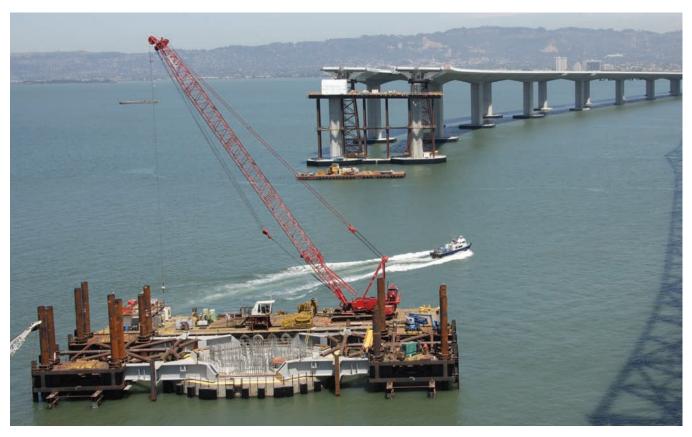
Engineering work continues on the Oakland Touchdown #2 Contract, where construction is scheduled to start immediately after westbound traffic shifts to the new East Span. This contract will complete the remaining section of the eastbound structure and roadway.



Aerial view of the Oakland Touchdown



**2009 ANNUAL REPORT** 



The SAS' two marine foundations—T1 (bottom) and E2 (top) came in ahead of schedule and under budget, thanks to the risk management team

### RISK MANAGEMENT

Risk management, as mandated by AB 144, is a critical component of the Bay Bridge Seismic Retrofit Projects, ensuring that construction and engineering jobs are on time and on budget. The risk management plan developed by Caltrans reflects a methodical approach of planning for, identifying, analyzing, responding to, and monitoring project risks. The goal is to help project leaders efficiently complete their projects while mitigating risks that might impede their success. While all project leaders are dedicated to ensuring the progress and success of their projects, the Risk Management Program provides a disciplined approach to risk identification, prioritization and response.

The National Cooperative Highway Research Program (NCHRP) has hailed the Bay Bridge approach to risk management as a sophisticated model for other transportation programs throughout the country. The NCHRP praised how "the overriding goal of the program is to help to keep the Bay Bridge Seismic Safety Projects on schedule and within budget." As the program has evolved, it has gained broad acceptance and is now an integral component of program and project management.

This unique process takes a comprehensive and fully integrated approach to each phase of project management, guided by a

dedicated and focused team that identifies and assesses potential risks and opportunities for each project on the East Span, thereby helping reduce program costs and keep projects on track.

Risk management has helped deal with the inherent risks in a project as massive and complex in scope and scale as the Bay Bridge. In 2008, the risk mitigation program worked closely with the SAS project team, focusing on issues including fabrication of the tower and deck segments, fabrication of the cable, and the procurement and delivery of the crane barge.

Knowing that even one day of delay may result in significant costs to the program, 2008 is a testament to everyone's dedication to mitigating delays and finding ways to accelerate construction schedules. The Skyway and the SAS marine foundations (T1/E2) came in ahead of schedule and under budget in 2008. In 2009, the risk management team will work diligently to ensure that the traffic shift to the temporary structure on Yerba Buena Island is on time, so that awarding YBITS Contract #1 will be made at the most opportune time and ensure the earliest possible corridor completion date.



### PROTECTING THE ENVIRONMENT— ACTING LOCALLY, LEADING GLOBALLY

The San Francisco Bay is home to one of the most diverse ecosystems in the world. To protect this ecological treasure, we have implemented a comprehensive program to protect the bay's environment during construction activities.

California has always led the nation—and often the world—when it comes to protecting the environment. We are taking numerous steps to make sure the Seismic Retrofit Projects do not impact the environment around the bridge, from wildlife and plants to the bay waters. A team of dedicated environmental professionals and wildlife monitors conduct weekly walkthroughs of the entire construction corridor to ensure that all projects are compliant with environmental laws, resource agencies' permits and environmental document commitments. Environmental staff also often respond to a variety of unexpected challenges. Specific efforts include:

- **COSCO BUSAN**—In late 2007, the oil tanker Cosco Busan struck the Bay Bridge, spilling oil into the bay. Our environmental team was involved in all aspects of clean up, including the initial deployment of oil booms to protect shorelines, rescuing oiled shorebirds and coordinating their transport and treatment with wildlife rescue and care centers, and the inspection, damage assessment and facilitation of clean-up activities.
- WATER QUALITY—A combination of soil erosion and sediment control methods are used to provide more effective pollution protection in the bay. Additionally, waste management and materials pollution control best practices are implemented for all waste, hazardous materials and equipment located on the project. Caltrans and the construction contractors work closely together to monitor each project area. An inspection program is in place to assist with identifying any deficiencies that may need to be corrected. If deficiencies are determined,



Platforms under the Skyway provide nesting habitats for cormorants



Eelgrass, critical to the Bay's ecosystem, is protected during construction

Caltrans and the contractors work closely together to determine the appropriate corrective action. The San Francisco Regional Water Quality Control District (Water Board) is formally notified when any major changes to the project are made. The teamwork between Caltrans and the contractor have made it possible to keep a good working relationship with the Water Board, and to comply with the National Pollutant Discharge Elimination System Permit.

- **BIRDS**—Platforms under the East Span will provide a nesting habitat for cormorants that currently roost under the Bay Bridge. Crews are also constructing a 500-square-foot island to serve as a habitat for roosting shorebirds, including the snowy egret and the ruddy turnstone. Efforts have also minimized conflicts between birds and traffic by keeping Canada geese from trying to cross eastbound lanes of I-80.
- FISH AND MARINE MAMMALS—Teams monitor for marine mammals during pile driving and other deep-water activity. In 2008, we helped with the rescue of a sea lion that was treated at the Marine Mammal Center in Sausalito, and successfully released at Point Reyes National Seashore. Teams also removed fish that otherwise would have been trapped by the placement of a temporary coffercell system as part of the construction of a temporary SAS support at the eastern edge of Yerba Buena Island.
- **EELGRASS**—This aquatic plant is crucial to the Bay's ecosystems, as it serves as a critical marine habitat and improves water quality by collecting and filtering organic matter and sediments. We have taken several steps to protect eelgrass beds, including installing remote turbidity monitors that measure changes in water quality which can impact eelgrass.



### **GATEWAY PARK**

The vision for Gateway Park represents an unprecedented opportunity to create what is potentially the most significant new public place in not just the Bay Area, but all of California. Building the new East Span, and the transfer of the former Oakland Army Base to the City of Oakland and East Bay Regional Park District, have led to this once-in-a-lifetime opportunity to transform 200 acres into a world-class waterfront public space.

Combining parkland and urban development, the potential for Gateway Park is unlimited. The final development will be visible to motorists, bicyclists and pedestrians traveling across the new East Span of the Bay Bridge, and will serve as a highprofile, iconic entry to the East Bay. In turn, Gateway Park will provide stunning views of the Bay, the San Francisco skyline, the Port of Oakland, Yerba Buena Island and the graceful new East Span.

In July, a visioning conference attracted major stakeholders including Oakland Mayor Ron Dellums, the Toll Bridge Program Oversight Committee, the San Francisco Bay Conservation and Development Commission, the East Bay Regional Park District, the Port of Oakland, the East Bay Municipal Utility District, the Association of Bay Area Governments and the Alameda County





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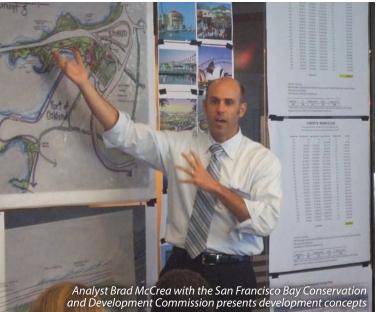
**Development concepts for Gateway Park** 



Transportation Improvement Authority. All who attended agreed that a world-class vision was needed for this world-class site.

This led to a four-day gathering in September, during which local and national planners and designers met with local and regional stakeholders to present and discuss potential development and land use concepts, as well as ideas for access and economic development potential.

The session concluded with a synthesis of the concepts presented as well as ideas generated during discussions and brainstorming sessions. Stakeholders plan to come together again in February 2009 for another visioning conference to further discuss refining concepts and the master plan for Gateway Park.









BayBridgeInfo.org homepage

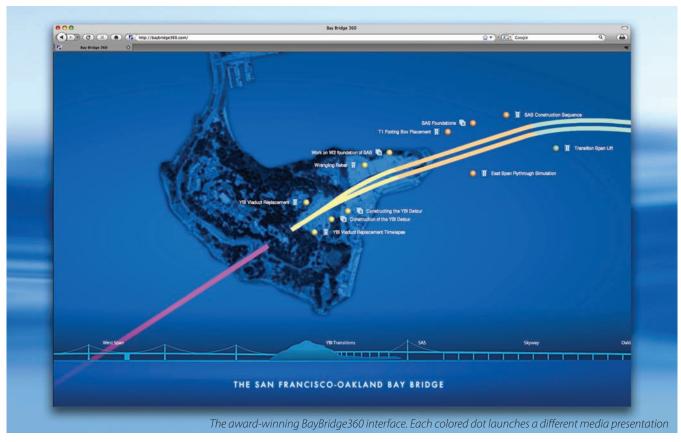


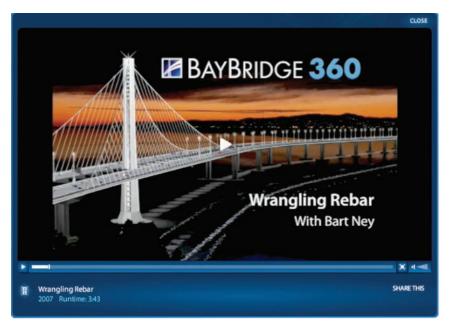
BayBridge360

### **OUTREACH/COMMUNICATIONS**

One word sums up the progress made in stakeholder outreach in 2008: innovation. From developing unique rich media content for the project Web site to partnering with some of the leading technology companies in the world, 2008 has been the most successful—and rewarding—year yet for pioneering new ways to reach the public and other stakeholders.

These efforts go far above and beyond the day-to-day out-reach efforts of the public information teams, as well as their incredible efforts for major milestones, such as the Yerba Buena Island viaduct replacement in 2007. These additional ambitious efforts, described below, help educate and inspire the public in extraordinary ways that provide unique perspectives of the Bay Bridge.





An original title and closing sequence with music he;ps create a unique "brand" to the SFOBB media projects

#### THE BAY BRIDGE ONLINE

In September, the Public Information Office launched a new addition to the Bay Bridge Web site, **BayBridgeInfo.org**. This new site—**BayBridge360**—is replete with rich media, offering bridge enthusiasts and the merely curious the opportunity to view spectacular and rarely seen videos and images of the seismic retrofit projects.

BayBridge360 features an innovative graphical interface that allows visitors to zoom in and out of key sections of the bridge. Visitors can watch videos, slide shows and animated simulations, each focusing on a key aspect of the Bay Bridge project. The videos are concise yet engaging.

New content will be added as the projects progress, with visually dynamic videos that not only capture the excitement and magnitude of the projects, but also provide a rare, front-row seat to watch history being made.

The section, which has attracted viewers from around the world, received acclaim from software company Adobe Systems, which named BayBridge360 as its "Site of the Day" on October 1. Adobe noted that "keeping people informed about their community as well as their tax dollars at work is important, and this site provides all the necessary details in an effective and captivating way."

Visitors can watch an animated simulation of the highly anticipated new East Span, including the pedestrian/bicycle path. While the simulation provides sweeping views, numerous videos on BayBridge360 offer a more intimate, close-up glimpse of the extraordinary construction work taking place right now. The complexity of the construction has to be seen to be believed, and viewers finally have that unique opportunity.

Visitors will find videos that tell the story of this bridge, including an overview of the seismic retrofit projects; the time-lapse video showing crews rolling in the 350-foot-long, 6,500-ton section of viaduct on Yerba Buena Island during Labor Day weekend 2007; and conceptual videos such as "Wrangling Rebar," showing construction crews working with the steel reinforcing bars in often unique and precarious situations.

#### Examples of BayBridge360 content



Wrangling Rebar Video



Simulated "fly-through" of the completed SAS



Timelapse demolition on the West Approach



Timelapse of the YBI Viaduct replacement



Slideshow of YBITS advance work

#### **EDUCATIONAL OUTREACH**

To better educate students about the Bay Bridge, as well as the numerous vocations involved with the retrofit projects, a dedicated educational outreach subcommittee was developed in 2008. The subcommittee identified numerous components to reach and educate students of all ages throughout the Bay Area.

One such opportunity is an in-class program that will visit elementary and middle schools in San Francisco and Oakland with presentations and a reading program about the Bay Bridge and retrofit projects that relate to the students' curriculum. The subcommittee has also discussed partnerships with two leading educational and science institutions in the Bay Area—the Lawrence Hall of Science (LHS) at the University of California at Berkeley, and The Exploratorium in San Francisco. The subcommittee has already begun developing educational content with LHS.



#### **Autodesk Exhibit**

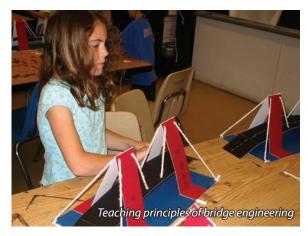
The Bay Bridge is among the select contributors to the Autodesk Gallery, which highlights the impact of the design and engineering software company's products on the process of innovative design. The Bay Bridge team was invited to participate in the 16,500-square-foot gallery, which is the first space in the Bay Area dedicated to design innovation. The Bay Bridge is just one of 20 exhibits, along with The Lego Group, the California Academy of Sciences, the Ford Shelby GT500, and the Cathedral of Christ the Light in Oakland.

#### **Google Earth**

Another technology leader choosing to partner with the Bay Bridge team is Google. The inclusion of the new Bay Bridge in Google Earth—which allows users to view satellite images, maps, terrain and 3D images—marks the first time a construction project has been represented in Google Earth. The finished sections of the new East Span appear next to the original East Span, while the sections that have yet to be built (such as the SAS) appear transparent. Visitors who click on the new East Span will see a pop-up window with more information about the bridge, as well as a link to the project Web site.

#### **Treasure Island Public Information Office**

A dedicated and fully-staffed public information office opened on Treasure Island in 2008, to keep residents and businesses on the island informed of the latest construction updates. This office will play an extremely critical role in the coming years, particularly during the flurry of activity around the construction of the SAS and YBITS.















#### **SMALL BUSINESS PROGRAM**

The Small Business Program continued to make strides in 2008 toward its goal of involving the small business community in the Seismic Retrofit Projects. The small business team, which expanded in 2008, is committed to achieving the goal of increased participation by providing ongoing support services, and ensuring these businesses are aware of contracting opportunities. The Toll Bridge Program was a leader in establishing a dedicated Small Business Program, with staff focusing solely on increasing the participation of small businesses and disabled veterans business enterprises (DVBE).

The team works closely with prime contractors to identify opportunities and to meet California's small business and DVBE participation goals, which are 25 percent and 3 percent of all contracts, respectively.

In 2008, the team continued its documentation and reporting of small business and DVBE participation and commitments to include these businesses in construction contracts on the East Span.

The Toll Bridge Program tracks Prime Contractor small business and DVBE participation commitments on the SAS, YBI Temporary Detour and Oakland Touchdown #1 contracts. Through the end of 2008, prime contractors have committed more than \$90 million in work to 85 small businesses and DVBEs. As a result of the team's partnering efforts on the Oakland Touchdown #1 Contract, the Statewide Small Business Council issued a Certificate of Recognition to MCM Construction for its ongoing efforts to provide contracting opportunities to small businesses.

To extend even more opportunities, the Small Business Program participated in the bidder's conference for YBITS Contract #1, which generated positive feedback from the small business community.

The program also worked in 2008 to develop additional training courses and to identify potential education partners, the results of which will be presented to small businesses and DVBEs in 2009.



#### **2009 ANNUAL REPORT**

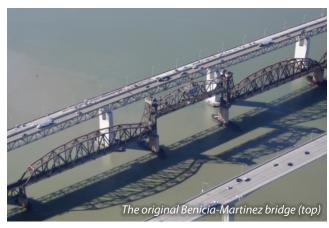
#### **BENICIA-MARTINEZ BRIDGE**

The original Benicia-Martinez Bridge, built in 1962, began undergoing a two-year reconfiguration that will eventually convert the entire bridge into four southbound lanes, with shoulders on both sides and a bicycle/pedestrian path. In 2007, the new northbound Benicia-Martinez Bridge opened to traffic in August just east of the original bridge.

The reconfiguration contract was awarded to American Civil Constructors and Top Grade Construction, a joint venture, in November 2007. To date, crews have rehabilitated the original northbound lanes by replacing all of the joints and damaged parts of the deck, as well as demolishing the original toll plaza. Southbound traffic has been shifted from the original southbound lanes to the repaired northbound lanes. In 2009, crews will replace the joints and deck of those southbound lanes.

Crews also have fixed the steep roadway undulation on northbound Interstate 680 just south of the Benicia-Martinez Bridge. Alterations have also been made to the Interstate 680/Interstate 780 interchange to better accommodate southbound and northbound traffic flowing on two separate bridges. Additionally, crews have begun raising nearby Marina Vista Road (leading to downtown Martinez), which often closes due to flooding during winter rains.

Work on the reconfiguration is expected to be entirely completed by late 2009, several months ahead of schedule.









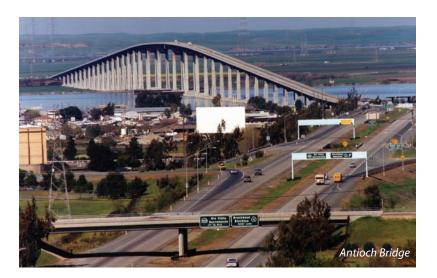


#### DUMBARTON AND ANTIOCH BRIDGES

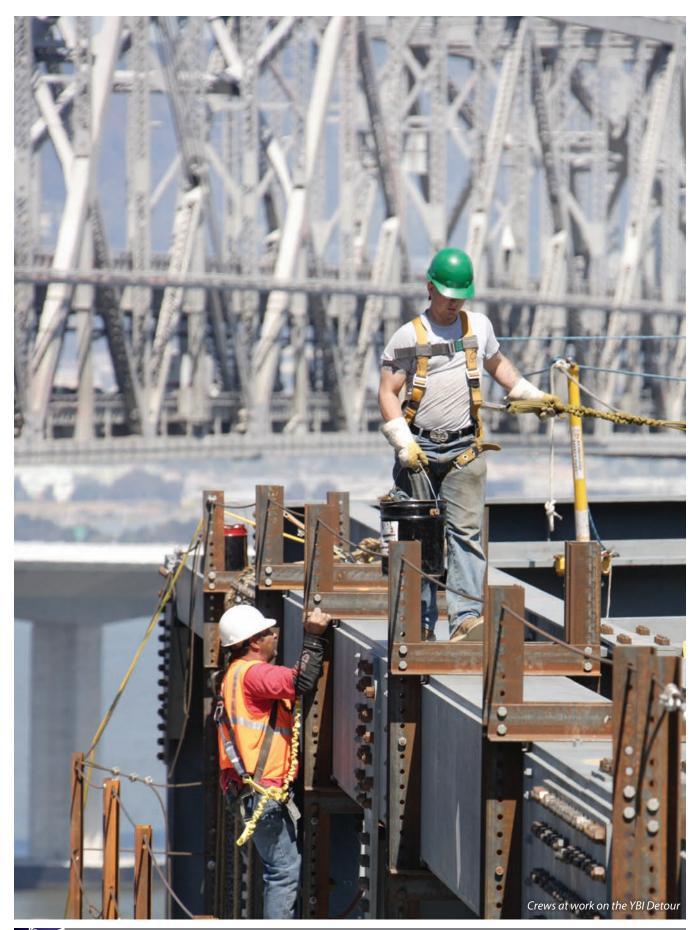
A new seismic study released in 2008 revealed an urgent need to retrofit the Antioch and Dumbarton bridges, built in 1978 and 1982, respectively. As both bridges were built to relatively recent seismic standards of the time, neither were considered at risk at the time the state Toll Bridge Seismic Retrofit Program (TBSRP) was established in 1997. However, due to findings from recent earthquakes, seismic standards are now much more stringent. The 1.8-mile-long Antioch Bridge carries 15,000 vehicles daily. The 1.6-mile-long Dumbarton Bridge carries 60,000 vehicles daily.

The three-year study—compiled by Caltrans and BATA—recommends that the TBSRP be expanded to include these two bridges. The study shows that both spans require significant seismic upgrades to protect public safety. A preliminary estimate of the combined cost is \$950 million—\$637 million for Dumbarton and \$313 million for Antioch. These costs are consistent with similar TBSRP retrofit projects, given the escalation of prices for labor and materials. Actual costs might be lower, as figures for both retrofits include evaluation and design expenses, as well as substantial risk management contingencies to allow the TBSRP to address unexpected issues that might arise during the four-year retrofit process.

BATA will need to raise tolls on the region's seven state-owned toll bridges to address three critical challenges: the nearly \$1 billion needed to retrofit the Antioch and Dumbarton bridges; a steady decline in toll-paying traffic since 2004; and fundamental changes in the municipal bond market since the credit market crisis began in the summer of 2007 that have increased BATA's borrowing costs by approximately \$35 million annually.









TOLL BRIDGE PROGRAM
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# 2009 LOOK AHEAD

The coming year will be the busiest yet for the Seismic Retrofit Projects. The TBPOC and the numerous teams involved will focus on making sure that the overall project continues to come in on budget and on schedule. The major focus in 2009 will be on the SAS, as well as the YBITS and Temporary Detour. Below are some of the major milestones anticipated in 2009:

#### SAN FRANCISCO-OAKLAND BAY BRIDGE

- The first **steel shipments from China** for the SAS tower and decks will arrive, as will the **shear leg crane barge** that will lift the SAS deck segments into place.
- Construction of the **temporary supports for the SAS** will continue throughout the year, while work on the main SAS structure will begin.
- A full closure of the Bay Bridge will be necessary to shift traffic onto the temporary detour at Yerba Buena Island so construction of the Yerba Buena Island Transition Structure's mainline can begin.
- Work on the **Oakland Touchdown** westbound roadway will be completed, allowing the SAS contractor to access the Skyway to work on the SAS.
- On the **West Approach**, the final westbound and eastbound roadway alignments will open to traffic in February, as will the **Harrison Street off-ramp**.
- YBITS Contract #1 will be awarded in 2009. The contract is to build the mainline structure that transitions the parallel decks of the SAS to the upper and lower decks to the YBI tunnel. Work on the remaining YBITS foundations will take place in 2009.
- To support outreach efforts, **BayBridge360** will continue to add new videos and photo slideshows throughout the year.
- The **Small Business Program** will implement a construction-based training program designed for small businesses performing work on active Bay Bridge construction contracts. The workshops will provide technical assistance relevant to the successful completion of their contracts. Additional workshops will be offered to enhance small businesses' ability to contract with Bay Bridge prime contractors. The program will launch its Web site, which will include information on small business activities and contract opportunities in District 4 and Statewide. The program will also host another YBITS outreach event in the spring.

#### **BENICIA-MARTINEZ BRIDGE**

The reconfiguration of the original bridge into four southbound lanes with shoulders is expected to be completed in 2009. Work will include replacing the joints and damaged deck on the original southbound lanes while southbound traffic uses the original northbound lanes. Crews will also fix the roadway undulation just south of the bridge on southbound Interstate 680 (the undulation on northbound I-6w80 was fixed in 2008), and finish elevating nearby Marina Vista Road.

#### **DUMBARTON BRIDGE AND ANTIOCH BRIDGE**

Design and construction plans and cost estimates for both bridges are expected to be ready in August 2009. Final regulatory agency permits are expected to be obtained in September 2009.

## **APPENDIX A**

Table 1: Toll Bridge Program Funding (as of September 30, 2008)

	Budgeted (In \$ Millions)	Funding Available & Contributions (In \$ Millions)
Toll Financing		
Seismic Surcharge Revenue AB 1171	\$ 2,282.0	\$ 2,282.0
Seismic Surcharge Revenue AB 144	2,150.0	\$ 2,150.0
BATA Consolidation	\$ 820.0	\$ 820.0
Subtotal—Financing	\$ 5,252.0	\$ 5,252.0
Direct Contribution		
Proposition 192	\$ 790.0	\$ 789.0
San Diego Coronado Toll Bridge Revenue Fund	\$ 33.0	\$ 33.0
Vincent Thomas Bridge	\$ 15.0	\$ 6.9
State Highway Account	\$ 745.0	\$ 745.0
Public Transportation Account	\$ 130.0	\$ 130.0
ITIP/SHOPP/Federal Contingency	\$ 448.0	-
Federal Highway Bridge Replacement and Rehabilitation (HBI)	\$ 642.0	\$ 642.0
SHA – East Span Demolition	\$ 300.0	-
SHA – "Efficiency Savings"	\$ 130.0	\$ 10.0
Redirect Spillover	\$ 125.0	\$ 125.0
Motor Vehicle Account	\$ 75.0	\$ 75.0
Subtotal—Contributions	\$ 3,433.0	\$ 2,555.9
Total Funding	\$ 8,685.0	\$ 7,807.9
Allocated to Date		\$ 6,900.1
Remaining Unallocated		\$ 907.8

 $Source: Toll\ Bridge\ Seismic\ Retrofit\ Program\ Third\ Quarter\ Report, as\ of\ September\ 30, 2008, Toll\ Bridge\ Program\ Oversight\ Committee.$ 



Table 2: Toll Bridge Program Approved Budget (as of September 30, 2008)

Contracts	AB 144/SB 66 Budget (in \$ Millions)	Current Approved Budget (in \$ Millions)
Completed Projects		
Benicia-Martinez	\$177.8	\$177.8
Carquinez	\$114.2	\$114.2
San Mateo-Hayward	\$163.5	\$163.5
Vincent Thomas	\$58.5	\$58.5
San Diego-Coronado	\$103.5	\$103.5
Bay Bridge West Span	\$307.9	\$307.9
Richmond-San Rafael	\$914.0	\$816.5
Ongoing Projects		
Bay Bridge West Approach	\$429.0	\$453.7
Bay Bridge East Span	\$5,486.6	\$5,702.1
Miscellaneous Program Costs	\$30.0	\$30.0
Subtotal—Completed and Ongoing Projects	\$7,785.0	\$7,972.7
Program Contingency	\$900.0	\$757.3
Total Program	\$8,685.0	\$8,685.0

 $Source: Toll\ Bridge\ Seismic\ Retrofit\ Program\ Third\ Quarter\ Report, as\ of\ September\ 30, 2008, Toll\ Bridge\ Program\ Oversight\ Committee.$ 

# Special Thanks to the Prime Contractors and Designers

## SAN FRANCISCO-OAKLAND BAY BRIDGE

## **Designers**

T.Y. Lin International/Moffatt & Nichol (a joint venture) PB America, Inc.

NorCal

(Self-Anchored Suspension Span/ Yerba Buena Island Detour)

## **West Approach**

**Tutor-Saliba Corporation** 

#### Yerba Buena Island Detour

C.C. Myers, Inc.

## **Self-Anchored Suspension Span**

ABF, a joint venture consisting of the American Bridge Company and Fluor Enterprises, Inc.

#### E2/T1 and Skyway

KFM, a joint venture of Kiewit Pacific Company, FCI Constructors, Inc. and Manson Construction Co.

#### W2

West Bay Builders

#### Oakland Touchdown #1

MCM Construction, Inc.

## Oakland Touchdown Submerged Electrical Cable Relocation

Manson Construction Co.

## **Stormwater Control Project**

**Diablo Construction** 

#### **Geotechnical Engineering**

Fugro/EMI

Gordon N. Ball, Inc. (Geofil)

## Yerba Buena Island Electrical Substation

West Bay Builders

#### Yerba Buena Island USCG Road Reconstruction

Granite Construction Co.

#### Yerba Buena Island Midden Work

Silverado Contractors Inc.

#### **Interim Retrofit of Existing East Span**

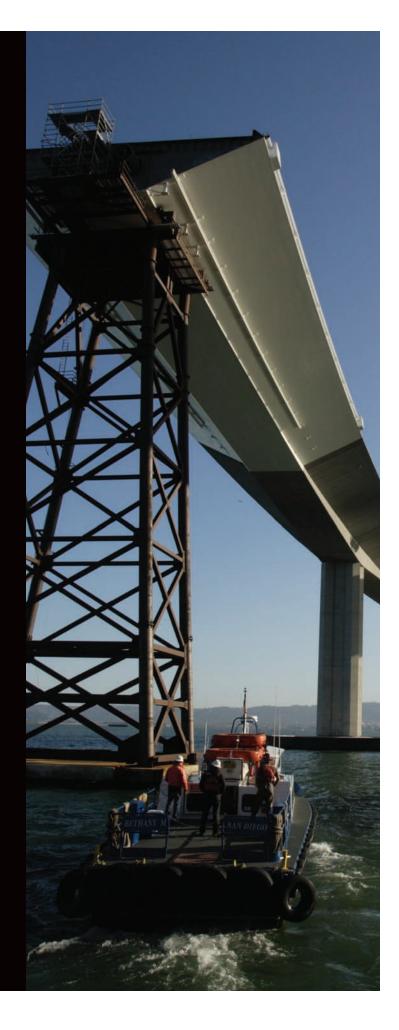
California Engineering Contractors

## **Retrofit of East End of Bay Bridge**

**Balfour Beatty Construction** 

## **BENICIA-MARTINEZ BRIDGE**

ACC Construction
Top Grade Construction





## **Credits**

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